VIBRATION ISOLATOR OF DISK PLAYER

Patent Number: JP2002170368
Publication date: 2002-06-14
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Requested Patent: JP2002170368
Application Number: JP20000367321 20001201
Priority Number(s):
IPC Classification: G11B33/08
EC Classification:
Equivalents:

Abstract

PROBLEM TO BE SOLVED: To provide a vibration isolator of a disk player which is capable of making a reproduction operation of the signal recorded at the optical disk by a laser beam irradiated from an optical pickup and recording the signals to this disk.
SOLUTION: The disk player is fixed with a spindle motor 7 for rotatably driving the disk and has a driving substrate fixed and supported by main vibration isolating members 3, 4, 5 and 6 at a stationary substrate 2. The disk player is provided with a substrate 13 for vibration isolation fixed and supported by auxiliary vibration isolating members 14, 15 and 16 at the driving substrate 1.

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報（A）**　(11)特許出願公開番号
特開2002－170368
（P2002－170368A）
(43)公開日　平成14年６月14日(2002.6.14)

(51)Int.Cl.⁷	識別記号	ＦＩ	ﾃｰﾏｺｰﾄﾞ(参考)
Ｇ１１Ｂ　33/08		Ｇ１１Ｂ　33/08	Ｅ

審査請求　未請求　請求項の数３　ＯＬ　（全　４　頁）

(21)出願番号　特願2000－367321(P2000－367321)

(22)出願日　平成12年12月１日(2000.12.1)

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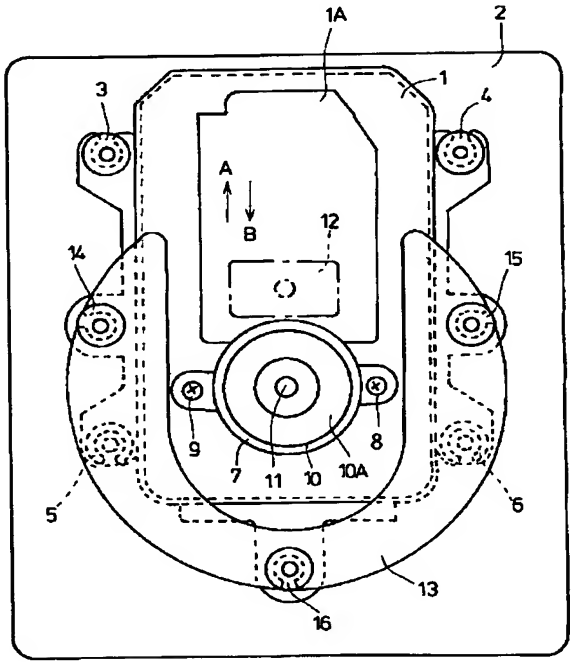
(54)【発明の名称】　ディスクプレーヤーの防振装置

(57)【要約】
【課題】　光学式ピックアップより照射されるレーザー光によってディスクに記録されている信号の再生動作や該ディスクに信号を記録することが出来るディスクプレーヤーの防振装置に関する。
【解決手段】　ディスクを回転駆動するスピンドルモーター７が固定されているとともに固定基板２に主防振部材３、４、５、６により固定支持されている駆動用基板１を備えたディスクプレーヤーにおいて、前記駆動用基板１に副防振部材１４、１５、１６にて固定支持された防振用基板１３を設ける。



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【特許請求の範囲】
【請求項１】　ディスクを回転駆動するスピンドルモーターが固定されているとともに固定基板に主防振部材により固定支持されている駆動用基板を備えたディスクブレーヤーにおいて、前記駆動用基板に副防振部材にて固定支持された防振用基板を設けたことを特徴とするディスクブレーヤーの防振装置。
【請求項２】　防振用基板の形状を馬蹄形にするとともにその欠部をピックアップの移動路として配置したことを特徴とする請求項１に記載の防振装置。
【請求項３】　防振用基板の重心の位置をスピンドルモーターの回転中心軸上に配置したことを特徴とする請求項１に記載の防振装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、ディスクに記録されている信号の再生動作や該ディスクに信号を記録する記録動作を行うことが出来るディスクブレーヤーに関し、特に防振装置に係る。
【０００２】
【従来の技術】光学式ピックアップを用いてディスクに記録されている信号の読み取り動作を行うディスクブレーヤーが普及しているが、斯かるディスクブレーヤーは、ディスクが載置されるターンテーブルを備えている。前記ターンテーブルに載置されるディスクは、クランプと呼ばれる手段によって該ターンテーブルとともに回転するべく該ターンテーブル上に固定保持されるが、該クランプ手段として磁石の吸着力を利用したものが開発されている。磁石の吸引力を利用してディスクのクランプ動作を行う技術は、ターンテーブル側に前記磁石によって吸着される磁性体が設けられるが、斯かるターンテーブルとしては、実開平５－２１３５４号公報に開示されたものがある。
【０００３】ディスクブレーヤーとしては、ＣＤプレーヤーが一般的であるが、最近では、音楽等の音声信号ではなく、コンピューターに使用されるデータ信号が記録されているＣＤ－ＲＯＭと呼ばれるディスクを再生するＣＤ－ＲＯＭプレーヤーと呼ばれるディスクブレーヤーが普及している。
【０００４】また、最近では、ディスクに記録されている信号の再生動作だけでなく該ディスクに信号を記録することが出来る記録再生型のディスクブレーヤーが多く普及している。
【０００５】
【発明が解決しようとする課題】ＣＤ－ＲＯＭプレーヤーは、音声信号を再生するＣＤプレーヤーと異なり、信号の高速読み出し動作が要求されるため、最近では、規定の線速度に対して、４倍、６倍、８倍及び１０倍等の高速の線速度にてディスクを回転させて信号の読み出し動作を行うように構成されたディスクブレーヤーが商品化されている。

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【０００６】ディスクを線速度が高速にて一定になるように回転駆動するためには、高価な特性の良いスピンドルモーターと精度の高い駆動制御回路が必要となるため、最近では、ディスクの回転速度を線速度一定ではなく角速度が一定になるように制御するように構成されたディスクブレーヤーが商品化されている。
【０００７】斯かるディスクブレーヤーに使用されるディスクの中には、重心の位置が中心よりずれた偏重心ディスクと呼ばれるディスクがあり、斯かるディスクを高速にて回転させると、異常振動が発生し、異音を発生するという問題がある。図４に示した特性図は、ディスクが回転した場合における振動の周波数と振動のレベルとの関係を示すものであり、共振周波数ｆ０にて最も振動のレベルが大きくなり、ディスクの回転特性が悪化する。
【０００８】斯かる問題を解決する方法として、例えば特開平１０－３０２３８３号公報に開示されているようなボールベアリングを使用したターンテーブル装置が開発されているが、ターンテーブルの回転に伴ってボールベアリング同士が衝突して騒音が発生するという問題がある。
【０００９】本発明は、斯かる問題を解決したディスクブレーヤーの防振装置を提供しようとするものである。
【００１０】
【課題を解決するための手段】本発明の防振装置は、ディスクを回転駆動するスピンドルモーターが固定されているとともに固定基板に主防振部材により固定支持されている駆動用基板を備えたディスクブレーヤーにおいて、前記駆動用基板に副防振部材にて固定支持された防振用基板を設けたものである。
【００１１】
【実施例】図１は本発明の防振装置の一実施例を示す平面図、図２は本発明の防振装置の要部を示す側断面図、図３は本発明の防振装置の振動特性図である。
【００１２】図において、１は固定基板２上に主防振部材３、４、５及び６によって固定支持されている駆動用基板であり、ディスクを回転駆動するスピンドルモーター７がネジ８及び９によって固定されている。１０は前記スピンドルモーター７の回転軸１１に固着されているターンテーブルであり、ディスクが載置される載置部１０Ａが設けられている。
【００１３】１２はディスクに記録されている信号の読み出し動作を行う光学式ピックアップであり、前記駆動用基板１上に設けられているガイド部材（図示せず）によってディスクの径方向、即ち矢印Ａ及びＢ方向への変位を可能に設けられているとともに該駆動用基板１上に固定されているピックアップ駆動用モーター（図示せず）によって変位せしめられるように構成されている。１Ａは前記駆動用基板１に形成されている透孔であり、

前記光学式ピックアップ１２が移動可能に配置されるとともに回路基板と該光学式ピックアップ１２とを連結するフレキシブル印刷配線基板が配置されるように設けられている。

【００１４】１３は防振用基板であり、図示したように馬蹄形にて構成されているとともに前記駆動用基板１上に副防振部材１４、１５及び１６によって固定支持されている。そして、前記防振用基板１３は馬蹄形に形成されているが、その欠部は、前記光学式ピックアップ１２の移動路として配置されている。また、前記防振用基板１３の重心の位置は、前記スピンドルモーター７の回転中心軸上、即ち回転軸１１の軸上に位置するように構成されている。

【００１５】斯かる構成において、駆動用基板１を支持する主防振部材３、４、５及び６によって防振する周波数は、例えば３５Ｈｚになるようにその弾性係数を設定し、防振用基板１３を支持する副防振部材１４、１５及び１６によって防振する周波数は、ディスクの回転特性を向上させるため目標となる回転速度に対応した周波数、例えば１００Ｈｚになるようにその弾性係数を設定する。そして、図３は本発明における振動特性図であり、この図より明らかなように共振周波数ｆ０の振動レベルを下げることが出来る。この共振周波数ｆ０の部分、即ち特性図の中の谷間の部分を低くすることによって目標の回転速度におけるディスクの回転特性を良好にすることが出来るが、防振用基板１３の重量と駆動用基板１の重量との比率を１対５程度に設定した場合に最も良い特性が得られた。

【００１６】図３に示した特性図において、ｆ０が目標の回転速度に対応した周波数、即ち防振用基板１３によって振動を抑えたい周波数であり、この場合には１００Ｈｚとなり、ｆ１及びｆ２は各々６０Ｈｚ付近及び１６０Ｈｚ付近の周波数になる。

【００１７】尚、本実施例では、防振用基板１３の形状として馬蹄形と表現したが、その形状は種々変形させることは可能である。即ち、光学式ピックアップ１２の変位動作に支障が無い形状であれば良いことは明らかである＊る。

【００１８】

【発明の効果】本発明の防振装置は、ディスクを回転駆動するスピンドルモーターが固定されているとともに固定基板に主防振部材により固定支持されている駆動用基板を備えたディスクプレーヤーにおいて、前記駆動用基板に副防振部材にて固定支持された防振用基板を設けることによって振動を抑えるようにしたので、ディスクの回転特性を向上させることが出来、更にボールベアリングを使用しないので、騒音の発生が無いだけでなく構成も簡潔になるという利点を有している。

【００１９】また、本発明は、防振用基板の形状を馬蹄形にするとともにその欠部をピックアップの移動路として配置させるようにしたので、防振用基板の上下方向の配置に規制を受けることがなく、ディスクプレーヤーの薄型化に対しても効果を奏するものである。

【００２０】そして、本発明は、防振用基板の重心の位置をスピンドルモーターの回転中心軸上に配置させたので、防振用基板による防振作用が均一となり、ディスクの回転特性向上に対して大きな効果を奏するものである。

【図面の簡単な説明】

【図１】本発明の防振装置の一実施例を示す平面図である。

【図２】本発明の防振装置の要部を示す側断面図である。

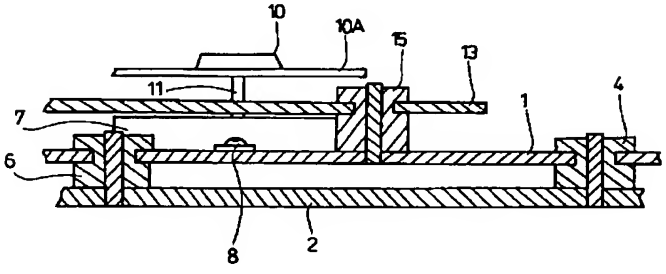
【図３】本発明の防振装置の動作を説明するための振動特性図である。

【図４】従来例を説明するための振動特性図である。

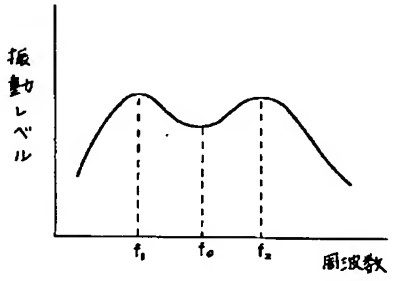
【符号の説明】

１	駆動用基板
２	固定基板
７	スピンドルモーター
１０	ターンテーブル
１１	回転軸
１２	光学式ピックアップ
１３	防振用基板

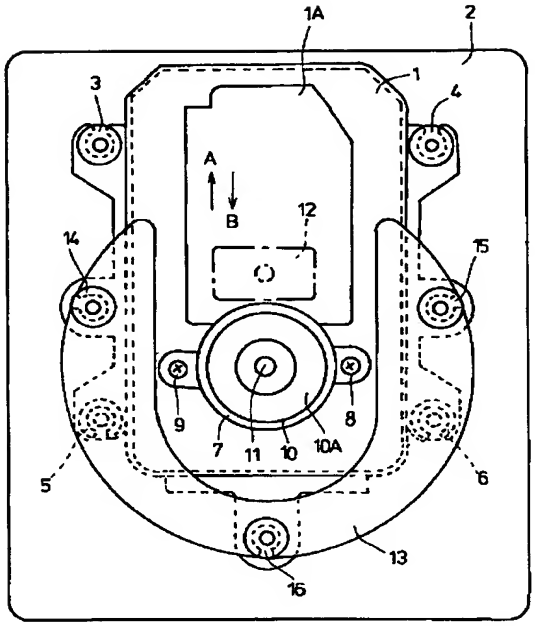
【図２】



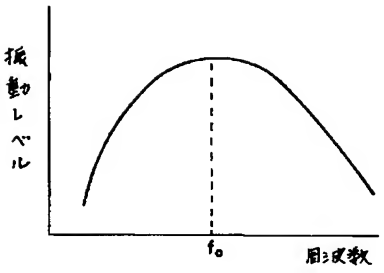
【図３】



【図１】



【図４】



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TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to especially a vibration isolator about the disk player which can perform record operation which records a signal on reproduction operation and this disk of the signal currently recorded on the disk.

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PRIOR ART

[Description of the Prior Art] Although the disk player which performs reading operation of the signal currently recorded on the disk using optical pick-up has spread, this disk player is equipped with the turntable in which a disk is laid. Although fixed maintenance is carried out on this turntable for the disk laid in the aforementioned turntable to rotate with this turntable by the means called clamp, what used the magnetic adsorption power as this clamp means is developed. The technology of performing clamp operation of a disk using a magnetic suction force has some which were indicated by JP,5-21354,U as this turntable, although the magnetic substance with which a turntable side is adsorbed by the aforementioned magnet is prepared.
[0003] As a disk player, although a CD player is common, recently, the disk player called CD-ROM player which plays the disk called CD-ROM on which not sound signals, such as music, but the data signal used for a computer is recorded has spread.
[0004] Moreover, recently, the record reproduction type disk player which can record a signal not only on reproduction operation of the signal currently recorded on the disk but on this disk has spread mostly.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to especially a vibration isolator about the disk player which can perform record operation which records a signal on reproduction operation and this disk of the signal currently recorded on the disk.
[0002]
[Description of the Prior Art] Although the disk player which performs reading operation of the signal currently recorded on the disk using optical pick-up has spread, this disk player is equipped with the turntable in which a disk is laid. Although fixed maintenance is carried out on this turntable for the disk laid in the aforementioned turntable to rotate with this turntable by the means called clamp, what used the magnetic adsorption power as this clamp means is developed. The technology of performing clamp operation of a disk using a magnetic suction force has some which were indicated by JP,5-21354,U as this turntable, although the magnetic substance with which a turntable side is adsorbed by the aforementioned magnet is prepared.
[0003] As a disk player, although a CD player is common, recently, the disk player called CD-ROM player which plays the disk called CD-ROM on which not sound signals, such as music, but the data signal used for a computer is recorded has spread.
[0004] Moreover, recently, the record reproduction type disk player which can record a signal not only on reproduction operation of the signal currently recorded on the disk but on this disk has spread mostly.

[0005]
[Problem(s) to be Solved by the Invention] The disk player constituted so that a CD-ROM player might rotate a disk to a regular linear velocity with high-speed linear velocity, such as 4 times, 6 times, 8 times, and 10 times, and might perform read-out operation of a signal recently, since high-speed read-out operation of a signal was required unlike the CD player which reproduces a sound signal is commercialized.
[0006] Since the high drive control circuit of a spindle motor with the expensive property that it is sufficient in order to carry out the rotation drive of the disk so that linear velocity may become fixed at high speed, and precision is needed, the disk player constituted so that not a constant linear velocity but angular velocity became fixed and the rotational speed of a disk might be controlled by recently is commercialized.
[0007] When there is a disk called mass-eccentricity disk with which the position of the center of gravity shifted from the center into the disk used for this disk player and this disk is rotated at high speed, there is a problem of a shimmy occurring and generating an allophone. The relation of the frequency of vibration and the level of vibration when the property view shown in drawing 4 rotates a disk is shown, the level of vibration becomes large most by resonance frequency f0, and the rotation property of a disk gets worse.
[0008] Although the turntable equipment which used a ball bearing which is indicated by JP,10-

302383,A as a method of solving this problem is developed, there is a problem that ball bearings collide with rotation of a turntable and noise occurs.
[0009] this invention tends to offer the vibration isolator of the disk player which solved this problem.
[0010]
[Means for Solving the Problem] The vibration isolator of this invention prepares the substrate for vibrationproofing by which fixed support was carried out in the subvibrationproofing member in the aforementioned substrate for a drive in the disk player which equipped the fixed substrate with the substrate for a drive in which fixed support is carried out by the main vibrationproofing member while the spindle motor which carries out the rotation drive of the disk is being fixed.
[0011]
[Example] The plan in which drawing 1 shows one example of the vibration isolator of this invention, the sectional side elevation in which drawing 2 shows the important section of the vibration isolator of this invention, and drawing 3 are the oscillation characteristic views of the vibration isolator of this invention.
[0012] drawing -- setting -- 1 -- the fixed substrate 2 top -- the main vibrationproofing -- it is the substrate for a drive in which fixed support is carried out by members 3, 4, 5, and 6, and the spindle motor 7 which carries out the rotation drive of the disk is being fixed with screws 8 and 9 10 is a turntable which has fixed to the axis of rotation 11 of the aforementioned spindle motor 7, and installation section 10A in which a disk is laid is prepared.
[0013] 12 is optical pick-up which performs read-out operation of the signal currently recorded on the disk, and it is constituted so that it may be made to displace by the motor for a pickup drive (not shown) currently fixed on this substrate 1 for a drive while the variation rate to the direction A of a path, i.e., the arrow, and the direction of B of a disk is prepared possible by the guide member (not shown) prepared on the aforementioned substrate 1 for a drive. 1A is a bore currently formed in the aforementioned substrate 1 for a drive, and it is prepared so that the flexible-printed-circuit substrate which connects the circuit board and this optical pick-up 12 may be arranged while the aforementioned optical pick-up 12 is arranged possible [movement].
[0014] as illustrated, while 13 is a substrate for vibrationproofing and consisting of horseshoe shape -- the aforementioned substrate 1 top for a drive -- subvibrationproofing -- fixed support is carried out by members 14, 15, and 16 And although the aforementioned substrate 13 for vibrationproofing is formed in horseshoe shape, the **** is arranged as a move way of the aforementioned optical pick-up 12. Moreover, the position of the center of gravity of the aforementioned substrate 13 for vibrationproofing is constituted so that it may be located on the center-of-rotation shaft of the aforementioned spindle motor 7, i.e., the shaft of the axis of rotation 11.
[0015]

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EFFECT OF THE INVENTION

[Effect of the Invention] While the spindle motor to which the vibration isolator of this invention carries out the rotation drive of the disk is being fixed In the disk player which equipped the fixed substrate with the substrate for a drive in which fixed support is carried out by the main vibrationproofing member, since vibration was made to stop by preparing the substrate for vibrationproofing by which fixed support was carried out in the subvibrationproofing member in the aforementioned substrate for a drive, the rotation property of a disk can be raised, and since a ball bearing is not used further, it has the advantage there is not only no generating of noise, but that composition becomes brief.
[0019] Moreover, since it was made to arrange the **** as a move way of pickup while this invention made the configuration of the substrate for vibrationproofing horseshoe shape, it does not receive regulation in arrangement of the vertical direction of the substrate for vibrationproofing, and takes effect also to thin-shape-izing of a disk player.
[0020] And since this invention arranged the position of the center of gravity of the substrate for vibrationproofing on the center-of-rotation shaft of a spindle motor, the vibrationproofing operation by the substrate for vibrationproofing becomes uniform, and it does a big effect so to the improvement in a rotation property of a disk.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The disk player constituted so that a CD-ROM player might rotate a disk to a regular linear velocity with high-speed linear velocity, such as 4 times, 6 times, 8 times, and 10 times, and might perform read-out operation of a signal recently, since high-speed read-out operation of a signal was required unlike the CD player which reproduces a sound signal is commercialized.
[0006] Since the high drive control circuit of a spindle motor with the expensive property that it is sufficient in order to carry out the rotation drive of the disk so that linear velocity may become fixed at high speed, and precision is needed, the disk player constituted so that not a constant linear velocity but angular velocity became fixed and the rotational speed of a disk might be controlled by recently is commercialized.
[0007] When there is a disk called mass-eccentricity disk with which the position of the center of gravity shifted from the center into the disk used for this disk player and this disk is rotated at high speed, there is a problem of a shimmy occurring and generating an allophone.

* NOTICES *

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the plan showing one example of the vibration isolator of this invention.
[Drawing 2] It is the sectional side elevation showing the important section of the vibration isolator of this invention.
[Drawing 3] It is an oscillation characteristic view for explaining operation of the vibration isolator of this invention.
[Drawing 4] It is an oscillation characteristic view for explaining the conventional example.
[Description of Notations]
1 Substrate for Drive
2 Fixed Substrate
7 Spindle Motor
10 Turntable
11 Axis of Rotation
12 Optical Pick-up
13 Substrate for Vibrationproofing

[Translation done.]

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MEANS

[Means for Solving the Problem] The vibration isolator of this invention prepares the substrate for vibrationproofing by which fixed support was carried out in the subvibrationproofing member in the aforementioned substrate for a drive in the disk player which equipped the fixed substrate with the substrate for a drive in which fixed support is carried out by the main vibrationproofing member while the spindle motor which carries out the rotation drive of the disk is being fixed.

[Translation done.]

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EXAMPLE

[Example] The plan in which drawing 1 shows one example of the vibration isolator of this invention, the sectional side elevation in which drawing 2 shows the important section of the vibration isolator of this invention, and drawing 3 are the oscillation characteristic views of the vibration isolator of this invention.
[0012] drawing -- setting -- 1 -- the fixed substrate 2 top -- the main vibrationproofing -- it is the substrate for a drive in which fixed support is carried out by members 3, 4, 5, and 6, and the spindle motor 7 which carries out the rotation drive of the disk is being fixed with screws 8 and 9 10 is a turntable which has fixed to the axis of rotation 11 of the aforementioned spindle motor 7, and installation section 10A in which a disk is laid is prepared.
[0013]

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CLAIMS

[Claim(s)]
[Claim 1] The vibration isolator of the disk player characterized by preparing the substrate for vibrationproofing by which fixed support was carried out in the subvibrationproofing member in the aforementioned substrate for a drive in the disk player which equipped the fixed substrate with the substrate for a drive in which fixed support is carried out by the main vibrationproofing member while the spindle motor which carries out the rotation drive of the disk was being fixed.
[Claim 2] The vibration isolator according to claim 1 characterized by having arranged the **** as a move way of pickup while making the configuration of the substrate for vibrationproofing into horseshoe shape.
[Claim 3] The vibration isolator according to claim 1 characterized by having arranged the position of the center of gravity of the substrate for vibrationproofing on the center-of-rotation shaft of a spindle motor.

[Translation done.]

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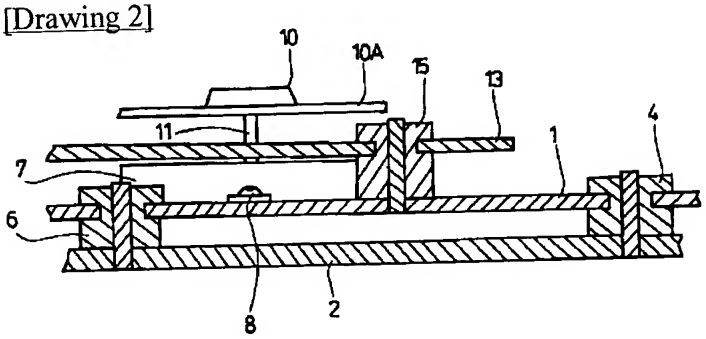
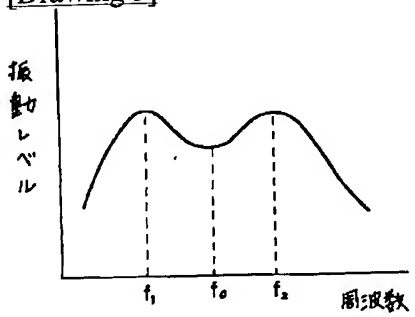
DRAWINGS

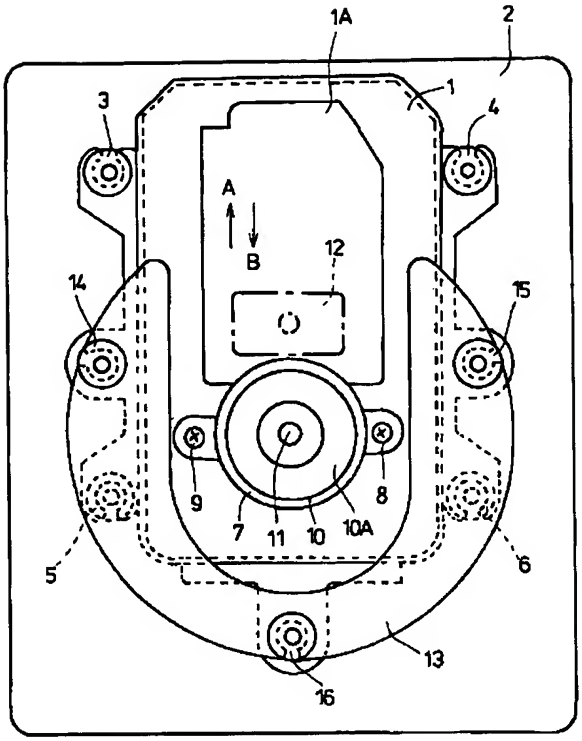
[Drawing 2]



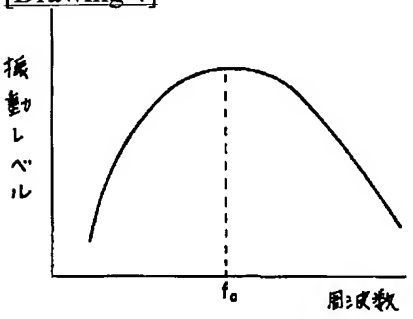
[Drawing 3]



[Drawing 1]



[Drawing 4]



[Translation done.]